CASE REPORT

Pancytopenia due to Vitamin B12 Deficiency in a 43-Year-Old Pregnant Woman: A Rare Case of Full Recovery

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Abstract

Vitamin B12 (B12) deficiency in pregnancy is common and associated with adverse outcomes like low birth weight and preterm birth, but pancytopenia due to this deficiency is rarely reported. We present a case of a 43-year-old multigravida woman who developed pancytopenia as a result of B12 deficiency, which was attributed to her dietary habits. Parenteral B12 treatment was initiated and successfully reversed the pancytopenia. At 36 weeks of gestation, the patient underwent a planned cesarean section, which proceeded without complications. The newborn baby had a normal Apgar score, weighed around 3000g, and showed no signs of neonatal issues. To the best of our knowledge, only two similar cases have been reported—one in Malaysia and another in the United Kingdom. This case highlights the importance of early detection and management of B12 deficiency in pregnancy to prevent complications for both the mother and baby. Timely intervention, as demonstrated in this case, can lead to favorable outcomes for both the mother and the fetus.

Keywords: *Anemia, pancytopenia, pregnancy complications, malnutrition, deficiency, vitamin B12 deficiency.*

INTRODUCTION

Vitamin B12 (B12) is an essential nutrient that acts as a cofactor for significant chemical reactions in the body. B12 is derived predominantly from animal foods, such as meat, fish, eggs, and milk [1]. Deficiency of B12 will usually manifest as a compilation of hematologic irregularities (macrocytic anemia, thrombocytopenia, or pancytopenia), neurologic symptoms (paresthesia, loss of proprioception, or autonomic nervous system dysfunction), and/or neuropsychiatric abnormalities such as depression, dementia, or mania [2]. Malabsorption is the most frequent cause of B12 deficiency [1]. Studies show a relatively high prevalence of deficiency among vegetarians. B12 deficiency in pregnant women ranges from 17% to 39% across trimesters [3]. The recommended daily allowance for B12 increases from 2.4 to 6.0 μg/dl during pregnancy. The total requirement of the fetus during pregnancy is estimated to be 50 μg, while maternal stores in women with mixed diets are estimated at >1000 μg [4]. B12 deficiency in pregnancy is prevalent and has been associated with lower birth weight (birth weight <2,500 g) and preterm birth (length of gestation <37 weeks) [5]. We report a case of a 43-year-old multigravida who presents with pancytopenia as a result of vitamin B12 deficiency.

CASE PRESENTATION

A 43-year-old woman with gravida 6 para 4 miscarriage 1 was admitted at 32 weeks of gestation with complaints of shortness of breath, dizziness, and lethargy. The patient was obese, weighing 100 kg, and was a known case of gestational diabetes mellitus and gestational hypertension. Upon examination, the patient appeared pale, and her vital signs were stable: blood pressure 110/60 mmHg, pulse rate 98 bpm, respiratory rate 20 breaths per minute, and oxygen saturation 98% on room air. There was no jugular venous distension, pedal edema, or lymphadenopathy. Cardiovascular and respiratory examinations were unremarkable, and abdominal examination revealed a gravid uterus consistent with a 32-week gestation. Neurological examination was regular. Her initial complete blood picture showed pancytopenia (**Table 1**). The abdominal ultrasound was routine. There was no evidence of fetal growth restriction. She was started on methyldopa 250 mg twice daily during this pregnancy for management of gestational hypertension. She was also taking metformin 500 mg twice daily for hyperglycemia and was compliant with the medications.

Table 1: Hematological parameters.

Hematological Parameters	Values	Range
Hemoglobin (g/dl)	6.6	1 1.0-15.5
RBC ($\times 10^6$ /ml)	2.26	3.8-5.2
Haematocrit (%)	20	35-47
Mean cell volume (fl)	88.8	80-100
Mean cell haemoglobin (pg)	29.5	27-34
Mean corpuscular hemoglobin concentration (g/dl)	33.2	30-35
White cell count ($\times 10^3$/ul)	3.8	4.0- 11.0
Platelets count ($\times 10^3$/ul)	117	150-450
Morphology of RBC	Normochromic,Anisocytosis,Oval Macrocytosis.	

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The patient was first diagnosed with moderate anemia (hemoglobin 8.6g/dl) at 16 weeks of gestation. For that, she received intravenous iron, an oral polysaccharide iron complex, and oral multivitamin tablets. Despite adequate medication, her hemoglobin continued to decline. At 27 weeks of gestation, her complete blood picture showed (hemoglobin 7 g/dL, leukocyte count 7.1 x 10^9/L, platelet count 306 x 10^9/L). She was admitted for 1 day and transfused with 2 packed cell volumes for anemia correction. Her serum folate levels were measured, yielding a result of 1.41 ng/dL. An oral folic acid supplement of 5mg once daily was added to the medication. The fetus did not show any signs of growth restrictions or distress. She was followed up at 29 and 30 weeks of gestation, with hemoglobin of 7.8g/dL and 7.7g/dL, respectively. However, at 32 weeks of gestation, she developed pancytopenia, with hemoglobin 6.6g/dL, white cell count 3.8×10^9/L, and platelet count 117×10^9/L. Mean corpuscular volume (MCV) was 88.8fL, and morphology showed normochromic red cells with anisocytosis and oval macrocytosis but without hypersegmented neutrophils. Tests for hepatitis B and C, HIV, dengue IgG and IgM, and Helicobacter pylori were negative. Gastric endoscopy was deferred because the patient was pregnant and clinically stable, and invasive procedures were avoided to minimize fetal risk. Her iron profile was within normal limits, while vitamin B12 levels were significantly low at 62.97 pg/mL. The lactate dehydrogenase level was elevated to 2550, and the direct coombs test was negative. Liver function tests, renal function tests, and thyroid function tests were standard, and there was no evidence of bleeding in the stools and urine. Given worsening B12 deficiency despite oral supplements, 1000 µg of intramuscular cyanocobalamin was given daily for 1 week, followed by weekly injections for 1 month. The patient's treatment progress was carefully monitored, which revealed improvement in her lab values, and at the tenth day of treatment, her pancytopenia resolved. The patient's hemoglobin level, platelet count, and white cell count were all within normal limits (**Table 2**), and her blood smear showed normochromic anisocytosis. The patient was monitored until delivery.

Table 2: Haematological Parameters during treatment.

Time Duration	Haemoglobin (g/dl)	White Blood Cells (/ul)	Platelets (x10^3/ul)
On Admission	6.6	3800	117
5th day of treatment	7.7	2600	49
6th day of treatment	8.6	3500	54
7th day of treatment	9.8	3500	53
10th day of treatment	9.5	4700	161
17th day of treatment	9.5	6800	418

The patient's main diet consisted of wheat, rice, pulses, and green vegetables. Although she was not a strict vegetarian, she consumed chicken weekly and red meat only occasionally. Her nutritional pattern was shaped by her low socioeconomic status, which limited consistent access to animal-based foods. She did not smoke, consume alcohol, or use any other drugs. Her past medical history was unremarkable, and she never had any surgery before, other than a cesarean section. In her past pregnancies, she had been diagnosed with anemia due to iron deficiency, but never developed pancytopenia before this pregnancy. From 2011 to 2018, she had five pregnancies. All deliveries were done *via* planned cesarean sections.

At 36 weeks of gestation, a planned cesarean section was performed. Delivery was uneventful, and the newborn baby had a normal Apgar score and weighed around 3000g; there were no indications of neonatal problems.

DISCUSSION

The case presented in this report highlights the successful management of pancytopenia in a pregnant patient with vitamin B12 deficiency. Although B12 deficiency can result from multiple etiologies, the patient's history of lower socioeconomic status, limited intake of animal-derived foods, and prior iron-deficiency anemia suggests a longstanding nutritional cause. While she consumed chicken weekly, it is a relatively poor source of vitamin B12 compared to red meat, which she consumed only occasionally. Sources of B12 in the diet include eggs, milk, fish, and other animal products rather than vegetables and fruits [1]. This is why B12 deficiencies are more prevalent among vegetarians, and the highest number of cases are reported in India [6].

B12-deficient mothers are at increased risk of developing gestational diabetes mellitus [7]. This is of significance because our patient was a known case of gestational diabetes mellitus. A mother who is B12-deficient can give birth to a B12-deficient child. Depending on the severity of the shortage, a B12 deficiency during pregnancy has different effects. Even though the majority of pregnancies progress uneventfully, B12 insufficiency has been linked to spontaneous abortion, intrauterine mortality, and low birth weight [8].

Additionally, infants born with low B12 levels have also been linked to higher insulin resistance [9, 10]. These babies exhibit typical development during their first 4 to 6 months of life. However, they could show symptoms like irritability, lethargy, feeding issues, refusal to eat solid meals, pale skin, and failure to thrive. Neurodevelopmental delay can progress to

neurodevelopmental regression if left unnoticed and neglected [6].

Newborn B12 concentrations are roughly double those of the mother because vitamin B12 is concentrated in the placenta and transmitted to the baby down a concentration gradient. Evidence shows that B12 absorption increases during pregnancy. The redistribution of cobalamin, hemodilution, and transfer to the fetus are proposed explanations for the decrease in serum B12 [4].

Treatment of B12 deficiency in pregnancy is identical to that of non-pregnant patients. In general, oral B12 supplementation is an option if malabsorption is not indicated. However, the parenteral route is preferred because it ensures greater treatment compliance and better absorption than oral supplementation [11]. To support fetal neurological development, the WHO and the US National Institutes of Health (NIH) advise pregnant women to consume more cobalamin daily (2.6 *vs*. 2.4 mg) than non-pregnant women [12, 13]. Serum B12 levels are directly correlated with B12 levels in breast milk. Therefore, exclusively breastfed babies are more prone to developing B12 deficiency if the mother has a low vitamin B12 status [4].

Interestingly, despite confirmed severe vitamin B12 deficiency and the presence of oval macrocytes on peripheral smear, the patient's mean corpuscular volume (MCV) remained within the normal range. The prior transfusion may have contributed to the transiently normal MCV by introducing normocytic donor cells that mixed with the patient's macrocytic cells. Similar findings have been described in case reports of megaloblastic anemia with normal MCV. This emphasizes the importance of interpreting hematologic indices alongside vitamin B12 levels rather than relying solely on MCV values [14].

Differential diagnoses considered included aplastic anemia, viral infections (HIV, hepatitis B and C, dengue), and hematologic malignancy. These were excluded based on normal liver and renal function tests, negative viral serologies, and the absence of abnormal or blast cells on peripheral smear. The rapid and sustained hematologic response following vitamin B12 replacement further supported the view that nutritional deficiency was the primary cause.

We recommend daily oral B12 supplementation for individuals at risk of B12 deficiency to avoid the maternal and fetal complications associated with it. This case report is critical because limited data are available on the prevalence of B12 deficiency in pregnancy, and deficiency leading to pancytopenia is rarely reported. To the best of our knowledge, only two similar cases have been reported in Malaysia and the United Kingdom [15, 16].

CONCLUSION

This case highlights the successful management of pancytopenia in a pregnant woman with vitamin B12 deficiency and emphasizes the importance of early diagnosis and treatment to prevent maternal and fetal complications. Clinicians should maintain a high index of suspicion for nutritional deficiencies in at-risk pregnant women, particularly those with limited intake of animal-derived foods, and remain alert to atypical laboratory presentations such as a normal MCV despite severe deficiency. This case also reinforces the value of routine hematological monitoring throughout pregnancy.

CONSENT FOR PUBLICATION

Written informed consent was obtained from the patient for the publication of their anonymized information in this article.

CONFLICT OF INTEREST

The authors declare no conflict of interest.

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Declared none.

AUTHORS' CONTRIBUTION

MAK contributed to the conception and design of the study, data analysis and interpretation, literature review, drafting and critical revision of the manuscript, and approval of the final version for publication.

MAD contributed to the literature review, the preparation of figures and tables, the drafting of the manuscript, and the approval of the final version for publication.

SA contributed to the acquisition of patient data, data analysis and interpretation, and approval of the final version for publication.

AN contributed to proofreading, critical revision of the manuscript for important intellectual content, and approval of the final version for publication.

GENERATIVE AI AND AI-ASSISTED TECHNOLOGIES IN THE WRITING PROCESS

During the preparation of this work, the authors used ChatGPT (GPT-4, OpenAI) in a limited manner to obtain language suggestions and perform minor proofreading in some parts of the manuscript. After using this tool, the authors reviewed and edited the content as needed and take full responsibility for the content of the published article.

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